

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US**REMARKS**

This paper is intended to be a complete response to the above-identified Office Action. It is believed no fee is due. If fees are required, however, the Commissioner is authorized to deduct the necessary charges from Deposit Account 501922/149-0105US.

Claims 64-69 have been withdrawn in response to a Restriction Requirement. Claims 1, 16, 27, 40 and 55 have been amended. No claims have been cancelled or added. Accordingly, claims 1 through 63 are currently pending in the instant patent application.

Response to Restriction Requirement

The Examiner has made a restriction requirement under 35 U.S.C. 121 as follows: Claims 1-63 have been assigned to Group 1 (drawn to methods, program instructions and systems for sorting an object) and claims 64-69 have been assigned to Group 2 (drawn to a data structure). Office Action at pages 2-3, ¶ 1.

Assignee elects to pursue claims 1-63 (Group 1). This election is made without prejudice to the underlying subject matter of claims 64-69 or to their continued prosecution in a divisional or continuation application.

Objections to Drawings

The Examiner has objected to the drawings because they include reference identifies "KEY RECORD-1 450" and "KEY RECORD-N 455" that are not mentioned in the Written Description portion of the pending application. Office Action at pages 3-4, ¶ 2.

A review of the pending application's Written Description indicates that it is not the drawings, but rather the written description itself that incorrectly identifies elements "KEY RECORD-1 450" and "KEY RECORD-N 455" in Figure 4. A substitute paragraph [0019] has been provided as part of this Reply (see above). It is believed one of ordinary skill in the art would have clearly understood the written description was in error because the identity of each of elements 450 and 455 (see FIG. 4 as originally

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

filed) was explicitly stated in the text of paragraph [0019]. Accordingly, the amendments to paragraph [0019] have been made to correct obvious typographical errors and do not introduce new matter.

The Examiner's careful reading of the Written Description and identification of this error is noted with appreciation.

Objections to the Specification

The Examiner has objected to the Specification "as failing to provide proper antecedent basis for the claimed subject matter ... Correction of the following is required: Parameter list in claim 5 has not been mentioned in the description." Office Action at page 5, ¶ 3.

Claim 5 is directed to a sort control card having a parameter list. Claim 5 depends from claim 4 which depends from claim 3 which, in turn, depends from independent claim 1. See originally filed claims 1, 3, 4 and 5. One specific embodiment of a "sort control card parameter list" as recited in claim 5 is shown in FIG. 5 and discussed in detail at paragraphs [0021]-[0024]. It is respectfully submitted that any individual having ordinary skill in the computer programming arts would clearly understand what a "parameter list" is and that the illustrative list shown in FIG. 5 is but one example of such a list. Accordingly, it is believed that the specification does support each and every claim. As a result, it is respectfully requested that the Examiner withdraw this objection.

Claim Amendments

Independent claims 1, 16, 27, 40 and 55 has been amended to recite that the expanded key information is not retained or stored to intermediate storage. Support for this amendment can be found in the Written Description as filed at, for example, paragraphs [0006], [0015], [0017] and [0020]. This aspect of the claimed invention was noted and distinguished in the Written Description at, for example, paragraphs [0005] and [0017].

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US**Section 102 Rejections**

The Examiner has rejected claims 1, 2, 9-11, 16, 17, 22-24, 27, 28, 35-37, 40 and 50-52 as allegedly being anticipated under 35 U.S.C. 102(b) by Assignee's Admitted Prior Art ("AAPA"). Specifically, the Examiner asserts that:

With respect to Independent claims 1, 16, 27 and 40, "AAPA teaches a **data sort method, comprising:**

'obtaining a plurality of data records and, for each data record' as an object typically includes one or more records (AAPA Paragraph 0002). Sort routine 100 reads and pads a record from the object being sorted (AAPA Paragraph 0003).

'extracting key information

expanding the extracted key information' as the act of padding converts variable length key fields to fixed length key fields of a size great enough to accommodate any value that the key may assume (AAPA Paragraph 0003). Therefore these lines teach us about getting the keys and then expanding them.

'storing the plurality of key records based on the expanded key information' as a sort utility is invoked that reorders and then stores the padded records in a result file (AAPA Paragraph 0003).

'reorganizing the plurality of data records to correspond to the order of the sorted plurality of key records' as one or more fields are designated as a sort key and that sorting reorders an object's records based on the value of the record's sort keys (AAPA Paragraph 0002). The object's records are being sorted based on the records' sort keys.

'storing the reorganized plurality of data records without their associated expanded key information to a working storage' as each sorted and padded record is then retrieved from the result file, unpadded and reloaded in the object (blocks 125,130 and 135) (AAPA Paragraph 0003). The records in the object are storing the unpadded keys instead of padded/expanded key information.

Office Action at pages 5-9, ¶ 4 (emphasis in original).

1. Legal Principles

"For a prior art reference to anticipate in terms of 35 U.S.C. 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 U.S.P.Q.2d (BNA) 1315, 1217 (Fed.

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

Cir. 1988). Further, the "identical invention must be shown in as complete detail as is contained in the patent claim" (*Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d (BNA) 1913, 1920 (Fed. Cir.), *cert. denied*, 493 U.S. 853 (1989)) and the "elements must be arranged as in the claim under review" (*In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d (BNA) 1566 (Fed. Cir. 1990), *reh'g denied*, 1990 U.S. App. LEXIS 19971 (Fed. Cir. 1990)). *See also* M.P.E.P. 2131.

2. Assignee's Admitted Prior Art Does Not Anticipate the Claimed Invention

In making the above rejection, the Examiner has ignored one element of the claimed invention and confused or conflated other separately recited elements. Specifically, the Examiner has ignored the claimed act of "storing the expanded key information in a key record." See independent claim 1 (independent claims 16, 27 and 40 also recite storing key information in a key record). The act of storing extracted and expanded key information into a key record as described and claimed is nowhere found in the cited prior art nor is this aspect of the claimed invention noted by the Examiner is the above-recited rejection.

The Examiner also appears to have conflated the recited "data records" and "key records" elements – treating the acts of storing expanded key information into a key record and sorting the key records as being equivalent to the act of sorting the prior recited data records. In each of the rejected claims, data records (from which key information is extracted) and key records (into which expanded key information is stored) are uniquely recited elements and are, therefore, not to be confused. This distinction is significant in that each of independent claims 1, 16, 27 and 40 recite sorting the key records and not the prior recited data records. Once sorted, the key records are used to reorganize the prior recited data records. While this may appear to be a subtle distinction, it is a distinction that is clearly recited in the claims and clearly not described as prior art.

In addition, independent claims 1, 16, 27 and 40 have been amended to recite that the expanded key information is not saved to intermediate storage – a feature that

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

is expressly identified as novel in the Written Description. See, for example, paragraphs [0005] and [0017].

In summary, the Examiner has failed to identify each recited element in the prior art and, further, has conflated uniquely identified elements of the recited invention with the prior art. For at least these reasons the Examiner has failed to present a legitimate *prima facie* anticipatory rejection under 35 U.S.C. 102. Accordingly, it is respectfully requested that the Examiner withdraw this rejection.

Section 103 Rejections: Claims 3-8, 12, 18-21, 29-34 and 41-49

The Examiner has rejected claims 3-8, 12, 18-21, 29-34 and 41-49 as allegedly being unpatentable under 35 U.S.C. 103(a) over Assignee's Admitted Prior Art ("AAPA") in view of U.S. Patent 5,247,665 to Mastuda et al. Office Action at pages 9-18, ¶ 5.

Each of the rejected claims depend from one of independent claims 1, 16, 27 and 40. As discussed above, each of independent claims 1, 16, 27 and 40 are allowable over the cited prior art. For at least these reasons dependent claims 3-8, 12, 18-21, 29-34 and 41-49 are allowable. Accordingly, it is respectfully requested that the Examiner withdraw this rejection.

Section 103 Rejections: Claims 13-15, 25, 26, 38, 39, 53-55 and 61-63

The Examiner has rejected claims 13-15, 25, 26, 38, 39, 53-55 and 61-63 as allegedly being unpatentable under 35 U.S.C. 103(a) over Assignee's Admitted Prior Art ("AAPA") in view of U.S. Patent 5,274,805 to Ferguson et al. Specifically, the Examiner asserts that:

With respect to Independent claim 55, "AAPA teaches a **data sort method, comprising:**

'obtaining a plurality of data records from a database object, for each of the plurality of data records' as an object typically includes one or more records (AAPA Paragraph 0002). Sort routine 100 reads and pads a record from the object being sorted (AAPA Paragraph 0003).

'extracting key information

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

expanding the extracted key information' as the act of padding converts variable length key fields to fixed length key fields of a size great enough to accommodate any value that the key may assume (AAPA Paragraph 0003). Therefore these lines teach us about getting the keys and then expanding them.

'storing the expanded key information in a key record' as once padded, the record is written to an intermediate file (block 110) (AAPA Paragraph 0003). The time required to write and read an intermediate file having expanded sort keys can consume a significant portion of the total time needed to sort the object (AAPA Paragraph 0003). The examiner interprets the key record as an intermediate file, which stores expanded sort keys.

'sorting the plurality of key records based on the expanded key information' as a sort utility is invoked that reorders and then stores the padded records in a result file (AAPA Paragraph 0003).

'reorganizing the plurality of data records to correspond to the order of the sorted plurality of key records' as one or more fields are designated as a sort key and that sorting reorders an object's records based on the value of the record's sort keys (AAPA Paragraph 0002). The object's records are being sorted based on the record's sort keys.

'storing the reorganized plurality of data records without their associated expanded key information to a working storage' as each sorted and padded record is then retrieved from the result file, unpadded and reloaded in the object (blocks 125,130 and 135) (AAPA Paragraph 0003). The records in the object are storing the unpadded keys instead of padded/expanded key information.

AAPA discloses the elements of claim 55 as noted above but does not explicitly teach the steps of **'repeating the acts of obtaining, sorting, reorganizing and storing for at least a second plurality of data records'**

'merging the at least two plurality of reorganized data records into the database object.' However, Ferguson discloses, **'repeating the acts of obtaining, sorting, reorganizing and storing for at least a second plurality of data records'** as in terms of a tree structure, the substrings are formatted as 'leaf nodes,' in that they comprise keys and pointers to records ...

[concluding that it] ... would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of the cited references because Ferguson's teaching would have allowed AAPA to require fewer storage system access and hence is generally faster (Ferguson Col 5, Lines 42-45) by

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

merging the reorganized data records and to sort key records first, and then build a tree based on keys extracted at intervals from sorted key records (Ferguson Col 3, Lines 2-4).

Office Action at pages 18-25, ¶ 6 (emphasis in original).

1. U.S. Patent 5,274,805 to Ferguson et al. ("Ferguson")

Ferguson appears to be directed to "sorting and compressing data that has particular advantages in implementing a key index tree structure." Ferguson at col. 1, lines 15-17. More specifically, sort methods in accordance with Ferguson use "substrings to sort strings of key records into a linked list structure that can be directly transformed into an index tree." Ferguson at col. 4, lines 39-41. In Ferguson, sorting "is carried out in two phases, consisting of a pre-sort phase (similar to the prior art), followed by one or more merge passes that take advantage of the concept of a 'substring'." Ferguson at col. 7, lines 4-7.

"In the pre-sort phase, a file of data records on a storage system is read and key records are extracted in known fashion ... sorted [and] ... written back to the storage system ... [where] ... as the sorted key records are written out onto the storage system, a 'substring field' is inserted at intervals in the data string to delimit the output string into substrings." Ferguson at col. 7, lines 8-30. See also Ferguson at col. 14, line 50 to col. 15, line 2 and FIG. 9 (elements 90-94). During the merge phase, "[s]ubstrings are read from the storage system into associated input buffers reserved in the computer memory." Ferguson at col. 8, lines 34-36. "Merge comparisons are performed on the contents of input buffer[s], ... with the sorted output records being stored in the output buffer. When the output buffer becomes full, it is written out to" storage. Ferguson at col. 8, line 67 to col. 9, line 4; see also FIGS. 3-5.

2. Legal Principles

A combination rejection requires three elements. First, there must be some suggestion or motivation to make the combination. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claimed elements. *In re Vaeck*, 947 F.2d 488, 493; 20 U.S.P.Q.2d (BNA) 1438, 1442

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

(Fed. Cir. 1991); M.P.E.P. 2143. "Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure." *In re Vaack*, 947 F.2d 488, 493 (Fed. Cir. 1991), *citing In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988).

3. Assignee's Admitted Prior Art and Ferguson do not Render the Claimed Subject Matter Obvious

As an initial matter, nowhere does Ferguson teach, describe or fairly suggest data objects that have variable length keys. There is absolutely no recitation in Ferguson that can be used to justify the Examiner's use of Ferguson in the context of the claimed invention – *extracting key information, expanding the extracted key information* ... See pending Independent claim 55. Accordingly, even if the Examiner's interpretation of AIPA is correct,¹ there is absolutely no teaching in Ferguson to justify its use in the context of data objects that have variable length keys. To the extent that Ferguson discusses compression of key information, it is key information (i.e., substrings) created by Ferguson that is compressed and not the key information retrieved from the data objects being sorted. Ferguson at col. 12, lines 47-57. As a result, there is no teaching (explicit or implicit) in Ferguson to suggest the claimed act of expanding key information extracted from a data object.

In addition, key records created in accordance with Ferguson are used to generate substrings that are *stored back to disk* – intermediate storage. As amended, independent claim 55 explicitly states that *expanded* key information (i.e., that information stored in the claimed key records) are not returned to intermediate storage. Not only does the Written Description identify this aspect of the invention as unique, it explicitly contrasts this operation with the prior art. Written Description at, for example, paragraphs [0005] and [0017].

1 As discussed above with respect to the Examiner's section 102 rejections, Assignee expressly disagrees with the Examiner's characterization of the admitted prior art.

REPLY TO OFFICE ACTION OF 25 JANUARY 2006

SERIAL NO: 10/618,500
DOCKET NO: 149-0105US

For at least these reasons the Examiner has failed to present a legitimate *prima facie* obviousness rejection under 35 U.S.C. 103 as to claims 13-15, 25, 26, 38, 39, 53-55 and 61-63. Accordingly, it is respectfully requested that the Examiner withdraw this rejection.


Section 103 Rejections: Claims 56-60

The Examiner has rejected claims 56-60 as allegedly being unpatentable under 35 U.S.C. 103(a) over Assignee's Admitted Prior Art ("AAPA") in view of U.S. Patent 5,274,805 to Ferguson et al. Office Action at pages 25-30, ¶ 7.

Each of the rejected claims depend from independent claim 55. As discussed above, independent claim 55 is allowable over the cited prior art. For at least these reasons dependent claims 56-60 are allowable. Accordingly, it is respectfully requested that the Examiner withdraw this rejection.

CONCLUSIONS

Reconsideration of the pending claims (1-63), in light of the above remarks is respectfully requested. If, after considering this reply, the Examiner believes that a telephone conference would be beneficial towards advancing this case to allowance, the Examiner is strongly encouraged to contact the undersigned attorney at the number listed.



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22 Feb 06

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